Ching Him Leung

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Professional Position

May 2024 - present **Hall C Postdoctoral Fellow**, *Jefferson Lab*

- Lead the commissioning of the GEM tracking detector for the SBS GEp experiment in Hall A.
- Participate in the LAD experiment in Hall C, and the commissioning of the GEM detector.
- Study the potential of the proposed SoLID experiment on the polarized sea quark distributions.

Education

Aug 2018 - May 2024 **Ph.D. in Physics**, *University of Illinois Urbana-Champaign*
Advisor: Prof. Jen-Chieh Peng
Thesis title: Probing Parton Distributions in Proton using Drell-Yan and Charmonium Production with 120 GeV Proton Beam at Fermilab

July 2014 - June 2018 **Bachelor of Science, Physics**, *The Chinese University of Hong Kong*

Other Research Experience

June 2019 - May 2024 **Research Assistant**, *University of Illinois, Urbana-Champaign*

FNAL-E906/SeaQuest
The aim of the experiment is to measure the light sea-quark asymmetry in proton using the Drell-Yan process.

- Analyze the charmonium production data to extract the $p+d$ and $p+p$ differential cross section and the $(p+d)/2(p+p)$ charmonium cross section ratio as an independent method to probe the $\bar{d}/\bar{u}$ asymmetry in the proton.
- Extract the $(p+d)/2(p+p)$ Drell-Yan cross section ratio from the entire SeaQuest datasets to extract the $\bar{d}/\bar{u}$ light sea-quark flavor asymmetry in proton for $0.1 < x < 0.45$.
- Develop an analysis procedure to ensure the statistical uncertainty from the simulation is properly included to extract te charmonium and Drell-Yan yield.
- Modify the Monte Carlo generator to ensure that proper kinematic constraints are applied.
- Prepare internal analysis notes and present progress reports in weekly meetings.

FNAL-E1039/SpinQuest
The follow-up experiment of SeaQuest, which aims to measure the Sivers asymmetry of the sea-quark using the Drell-Yan process with a polarized target.

- Migrating the data acquisition system from SL6 to SL7.
- Manage and maintain the SpinQuest DAQ and computing systems.

May -Aug 2016 **Summer Student**, *University of Illinois, Urbana-Champaign*

- Analyze transverse momentum distribution from existing Drell-Yan production data under the supervision of Prof. Jen-Chieh Peng.
- Perform fixed order QCD calculation for Drell-Yan process and compared with data.

Teaching Experience

Aug 2018 - May 2019 **Teaching Assistant**, *University of Illinois, Urbana-Champaign*
- Modern Experimental Physics (Spring 2022)
- Classical Mechanics II (Spring 2019)
- Atomic Phys & Quantum Theory (Fall 2018)

July - Aug 2015 **Junior Research Assistant**, *Faculty of Education, The Chinese University of Hong Kong*

Assisted instructors in conducting enrichment course in the summer Program for the Gifted and Talented 2015.

Honors and Awards

2022 **Felix T. Adler Award**, *University of Illinois, Urbana-Champaign*

For outstanding work by physics graduate student in the area of nuclear physics.

2020 **Maurice Goldhaber Research Scholar Award in Nuclear Physics**, *University of Illinois, Urbana-Champaign*

Awarded to outstanding graduate students who consistently demonstrates the highest level of performance in a nuclear physics research program.

Publications

- C. H. Leung et al. (SeaQuest Collaboration), *Final SeaQuest results on the flavor asymmetry of the proton light-quark sea with proton-induced Drell-Yan process*, (Dec. 19, 2025) arXiv:2512.17564 [hep-ex], http://arxiv.org/abs/2512.17564 (visited on 12/23/2025), pre-published
- C. H. Leung et al. (SeaQuest Collaboration), "Measurement of J/ψ and $\psi\,(2S)$ production in $p+p$ and $p+d$ interactions at 120 GeV", Phys. Lett. B **858**, 139032 (2024), arXiv:2406.11459 [hep-ex]
- J. Dove et al. (SeaQuest Collaboration), "Measurement of flavor asymmetry of light-quark sea in the proton with Drell-Yan dimuon production in $p+p$ and $p+d$ collisions at 120 GeV", Phys. Rev. C **108**, 035202 (2023), arXiv:2212.12160 [hep-ph]
- C. H. Leung (SeaQuest Collaboration), "Measurement of Charmonium Production in $p+p$ and $p+d$ Interactions in the Fermilab SeaQuest Experiment", in 29th International Workshop on Deep-Inelastic Scattering and Related Subjects (July 2022), arXiv:2207.05640 [hep-ex]
- J. Dove et al. (SeaQuest Collaboration), "The asymmetry of antimatter in the proton", Nature **590**, 561 (2021), arXiv:2103.04024 [hep-ph]
- A. Chen et al. (SeaQuest Collaboration), "Probing nucleon's spin structures with polarized Drell-Yan in the Fermilab SpinQuest experiment", PoS **SPIN2018**, edited by P. Lenisa, G. Ciullo, M. Contalbrigo, and L. Pappalardo, 164 (2019), arXiv:1901.09994 [nucl-ex]
- W. Gong et al., "Stable Intrinsic Long Range Antiferromagnetic Coupling in Dilutely V Doped Chalcopyrite", Chinese Phys. Lett. **37**, 027501 (2020)

Conference Presentations

Jan 2025 **Probing the proton structure with Drell-Yan process and charmonium production at the SeaQuest experiment**

Invited talk at Cold Nuclear Matter Effects: from the LHC to the EIC Workshop.

March 2023 **Drell-Yan and charmonium production in $p+p$ and $p+d$ interaction at 120 GeV from the SeaQuest experiment**
Contributed talk at DIS2023: XXX International Workshop on Deep-Inelastic Scattering and Related Subjects.

Oct 2022 **Drell-Yan and charmonium production in $p+p$ and $p+d$ interactions at 120 GeV from the SeaQuest experiment**
Contributed talk at 2022 Fall Meeting of the APS Division of Nuclear Physics.

May 2022 **Measurement of charmonium production in $p+p$ and $p+d$ interaction in the Fermilab SeaQuest experiment**
Contributed talk at DIS2022: XXIX International Workshop on Deep-Inelastic Scattering and Related Subjects.

Oct 2021 **Measurement of J/ψ and ψ' production in $p+p$ and $p+d$ interaction with 120 GeV proton beam in the Fermilab SeaQuest experiment**
Contributed talk at 2021 Fall Meeting of the APS Division of Nuclear Physics.

Oct 2020 **Measurement of $p+d/p+p$ J/ψ cross section ratio with 120 GeV proton beam in the SeaQuest experiment**
Contributed talk at 2020 Fall Meeting of the APS Division of Nuclear Physics.

Technical Skills

Programming	C/C++, Python, SQL	Tools	Git, Apptainer/Singularity
HEP Library	ROOT	OS	Linux